

NEWS REPORT

National Academy of Sciences National Research Council

VOLUME II

July-August 1952

NUMBER 4

Freedom and Responsibility of Science*

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IF you were brought up on *Alice in Wonderland*, you may remember that in the sequel, where she went through the Looking Glass, she found herself with the Red Queen in a country cut up into blocks like a chess board. They both ran very hard till Alice was quite exhausted but, when the Red Queen allowed her to rest, she found they were still in the same place, by the same tree. Alice was surprised and told the Queen that in her country she would have expected to get somewhere after all that running. "A slow sort of country," said the Queen. "Now here, you see, it takes all the running you can do to keep in the same place. If you want to get somewhere else you must run at least twice as fast as that."

I expect other people have quoted that passage to you when they have come to visit the United States. Things happen fast enough here; the cities are like a chess board and at certain times of the day you can go as quickly as a powerful car will take you down the main streets without making any perceptible advance. But I wasn't thinking of New York or Washington or this or that country. I was thinking of this new sort of world in which we now

live where science really comes into the picture in a big way.

It takes all the running we can do to keep in the same place. Twenty years ago most of us were harmless people doing a useful job in a laboratory and sitting on a few university committees. No one paid much attention to us and our political views did not matter. There was no difficulty about entering the United States; all we had to do was to sign a paper saying that we were not coming over to blow up Congress and the State Department. But, nowadays, it is not always enough to renounce such straightforward ambitions and, when we do, they won't always take our word for it. Science has become too powerful a tool and we have all become potentially dangerous people. It is flattering, of course, to be thought so important, but it is true enough that, even with the best of intentions, what we do may be a danger not merely to our own people but to the whole civilized world. Everything goes so fast that our science may be using up all our resources and letting us in for all sorts of new troubles if we don't keep up with it—and, if we want to keep ahead, we must go twice as fast.

Sooner or later, I suppose, the pace will slow down and we must not exaggerate the difference that science will make in the long run. Charles Darwin made our

*Address delivered at the 89th annual meeting of the National Academy of Sciences, in Washington, D. C., April 29, 1952.

grandfathers take it seriously, but now his grandson, the mathematical physicist, has just written a book about what is likely to happen to mankind in the next million years. He thinks that, barring accidents, mankind will still be about and that by and large it will go on pretty much as it does now. There will be scientific advances, of course, to make life more comfortable and increased populations to make our problems more difficult. There will be all sorts of local and temporary distortions, wars and dictatorships and new creeds and so on, but he thinks that the general pattern is not likely to change very much because mankind is not likely to change its nature, mainly because we could never agree about the particular changes that ought to be made. It is in our nature to go on distrusting the reformers and the dictators and the politicians, and not even the psychiatrists will be allowed to run us for long enough to make much difference. Some people may think that a disappointing conclusion.

Well, I expect it may be true that, if you average the next million years, science is not going to make us much better off or much worse off than we are now. But what about the next one hundred years or the next ten years? What are we to do to make sure that science does not get ahead of us now, that these new powers won't turn the heads of all the people who want to improve the world but don't agree about the way to do it? Many of them are worthy people, but we can't be sure that they will behave reasonably. We might get some help from the physicists again. They are accustomed to dealing with large assemblies in a state of internal agitation; they know what is solid and what is gas, and they should even be able to predict how the events taking place in a closed system will depend on the degrees of freedom in it and what will make it boil over. But there is another way in which we can help ourselves. We may be a fixed biological species unable to change our ways, but one of the achievements of our species is that we have learned how to talk things over and exchange views with one another.

Three hundred years ago The Royal Society started its meetings to talk over the

improvement of natural knowledge. They began as a band of amateurs, mostly wealthy and well connected. Naturally The Royal Society had the King at its head, but King Charles II was a wise man who never believed in the policy of forcing everyone to think the same way. We owe a great deal to his interest in science. He gave us our Royal Charter and the fine silver gilt mace which you can see at Burlington House, and his encouragement did not stop there. Science, of course, was not his only interest; he had others which were a heavy drain on his purse, but in spite of them he made the Society a grant of Chelsea College and the lands belonging to it, and then later he paid the Society thirteen hundred pounds to let him have it back again to turn into a hospital for wounded soldiers; and, on top of that, he gave the building of the new Chelsea Hospital to the foremost architect of the time who was none other than the President of The Royal Society, Sir Christopher Wren.

He did intervene once at least in the election of the fellows. There was a London shopkeeper, John Graunt, who had spent his spare time examining what were called the "Bills of Mortality" and had published the first book on vital statistics, *Natural and Political Observations upon the Bills of Mortality*. The King was so interested in it that he recommended that the Society elect him and gave them "a particular charge that if they found any more such tradesmen, they should be sure to elect them without more ado." No one could quarrel with that sort of intervention from the head of the State; in fact it shows how well the King understood what a scientific academy ought to be.

Since The Royal Society was founded, many academies of science have grown up on the same lines and they have become the world court where we pool our experiences and decide what to do next. They have become powerful and influential bodies, as they ought to be. Individuals may be able to run faster, but societies have a good deal more weight behind them when it comes to decisions which affect the national welfare. The important thing is that they must not carry so much weight that they are a drag on the rare people

who go ahead so fast that we can scarcely see what they are after. And they must keep their independence and their status as amateurs rather than professionals doing whatever the promoters want. They need not be very wealthy amateurs, but they ought not to be so dependent on the state that they are forced to do its pleasure.

Nowadays it is not so easy to prevent that happening. As you know, the inhabitants of Great Britain today are not so very far from being entirely dependent on the State. Most of our universities are maintained by state funds and nearly all the doctors and scientists get their income directly or indirectly that way. I don't think this is likely to change much in the near future whatever government we may get, but, so far, I don't think we have really suffered much from it. The University Grants Committee has been going long enough to have established the tradition that the universities must be allowed to run themselves. And as far as medicine is concerned, the universities control the teaching, so that there is not much danger that medicine will be forced into a set pattern unless it is just what the doctor orders.

That, of course, is the danger that we have to face when the State takes charge of us—the danger that we shall all be forced into a set pattern. You don't need to be told that, for you have shown us all how much faster things can go under private enterprise. And private enterprise is the life blood of science: freedom to go off in new directions, to follow the unexpected observation, to make mistakes and waste one's time. There is a danger, probably in every country nowadays, that scientific research will become concentrated in large institutes with ample government funds, but with a board of directors who have planned the whole program in advance. There is even a danger nowadays that some lines of scientific work may become concentrated in institutes which are not merely national but are international. Here one might expect to find palatial buildings with all the libraries and card indexes and apparatus and administrative staff that their directors can think of, where everyone works under one roof without the risk of overlapping or finding that some other laboratory has done

the same thing and done it better or found a different answer. Here science would be without competition and it would make no mistakes, because there would be no one outside to show that we had made them. It would be science without tears, but without much chance of discoveries.

Well, that may be all right for certain kinds of work and for certain kinds of people, but it would be a disaster to science in general if we had to give up the small units with the independent leaders who can make the advances which nobody has planned and who are not in any danger of losing their jobs if they show that the influential people have all been thinking along the wrong lines. Enlightened government departments here as well as in England can keep small teams as well as large teams going and can let them work as they please. Whether large or small, these teams can receive the advice and support of bodies like The Royal Society and the National Academy of Sciences. And we can be impartial advisers as long as we are not tied up too closely with the State ourselves.

I think we both follow the pattern approved by King Charles II. We keep our independence because we have funds of our own and so can really help to steer private and public funds in the right direction. It takes time of public-spirited people to serve on the advisory committees and it requires careful selection of these people to see that they are sensible as well as public-spirited.

I said that the scientific academies had become a sort of international court, but it is a court which does most of its business without formal meetings. We have a long tradition of informal meetings and friendships which make formal contacts unnecessary. For instance, I have, of course, heard of Dr. Bronk before now, but officially we haven't even exchanged illuminated addresses. But events are driving the English-speaking scientists along a common path and it may become important that our contacts should not be left to individuals and groups or to the representatives of government and of industry. Our two organizations, the National Academy of Sciences and The Royal Society, have common re-

sponsibilities. We represent a great deal of the scientific effort of the world and we must both run abreast to see that scientific effort is properly directed and used.

Your invitation to me to represent The Royal Society at this meeting is a great encouragement to those of us who believe that two heads are better than one. You have a long tradition of courtesy and hospitality to scientists from other countries. I was reminded of it by our great physiologist, Sir Charles Sherrington, a few months before his death. He talked to me about his visit to Yale nearly fifty years ago to give the Silliman Lectures and said how greatly touched he had been by all the kindness he had received from the American physiologists.

Those of you who have met Sherrington may say that it was natural for physiologists to be kind to him. He was that sort of man. But I do want to put it on record that your hospitality gave Sherrington some extremely pleasant memories to cheer him in his ninety-fifth year. Since then many of us have had just the same kind of experience; and so, when I had your written

invitation, I had no need to think twice before accepting.

Speaking with official solemnity, let me assure you that The Royal Society would have thought very poorly of me if I had declined an honor which reminds us of scientific friendships dating from the eighteenth century. And speaking unofficially, I don't need to say how delighted I am to be the guest of the Academy, to meet so many friends, and to listen to such exciting scientific discussion. Attending your meetings, I have felt like Alice being dragged along by the Red Queen, managing for a time at least to keep up with the new country. No one can say that it is not an extremely interesting country. I expect that, like Alice, we shall find that the prospects that frighten us, battles between Tweedledum and Tweedledee and the intervention of the monstrous Crow and the fall of Humpty Dumpty, are not going to be as disastrous as we think. I believe that we shall find that the new country is not such a difficult one to get about in, and I thank you for giving me such an encouraging prospect of it to take back across the Atlantic.

Manpower Resources and Characteristics

DAEL WOLFLE

Director, Commission on Human Resources and Advanced Training

MANPOWER problems during and since World War II have repeatedly emphasized the need for much more detailed information than has ever been available in the past concerning the nation's intellectual resources. One of the agencies involved in securing and analyzing that information is the Commission on Human Resources and Advanced Training. The Commission, which was appointed by and is under the auspices of the Conference Board of Associated Research Councils, consists of twelve men: Donald S. Bridgman, A. J. Brumbaugh, C. W. de Kiewiet, E. D. Grizzell, Quinn McNemar, Charles E. Ode-

gaard, Ralph A. Sawyer, Frederick F. Stephan, M. H. Trytten, Paul Webbink, F. L. Wilkinson, Jr., and Malcolm M. Willey. The Commission and its staff and studies are supported by a grant from the Rockefeller Foundation.

The Commission early decided that it would work on three closely interrelated problems: 1) What is the size and what are the characteristics of the current supply of people trained in each of the fields which requires a moderately high level of intellectual ability and the lengthy training ordinarily given by a college, graduate school, or professional school? 2) How large is the po-

tential supply of students who, with proper training, would be qualified for work in these specialized fields? 3) What are the demands now and what are they likely to be in the future for people trained in the sciences and other specialized fields?

The Commission staff has been working on these problems since October, 1950, and is preparing, for completion late this year, a volume summarizing its findings. In that effort the Commission has had the generous cooperation of many other groups and agencies interested in manpower problems: the U. S. Office of Education, the Bureau of Labor Statistics, the Bureau of the Census, the Educational Testing Service, the Psychological Corporation, the officers of many scholarly and professional societies, and the registrars and other officials of a large number of colleges and universities in all parts of the country.

In addition to gathering data already available from other sources, the Commission has conducted several special studies. In one, forty colleges and universities supplied personnel records of all students who entered in the fall of 1946 and have indicated how far each student progressed in school, whether or not he graduated, and in what field he specialized. With the cooperation of the University of Michigan and the Ohio State University, a follow-up study is being made of graduates of 1930, 1940, and 1951. These studies will give information about the characteristics of students who major in different fields, differential information about those whose careers are in the same field as their college majors and those who switch to something else after leaving college, and information about the work history, earnings, and other characteristics of each group.

Several of the Commission's studies have started with high school students in an effort to investigate the potential supply before college entrance. The most detailed study includes all students who entered ten of the Chicago public high schools in the fall of 1942. Each student's career has been followed for as long as he remained in some kind of educational institution. In process is a comparison, in terms of academic, intellectual, and socio-economic variables, of students who progressed to different levels

and of those who entered different fields of specialized training.

The Commission's report will cover four major topics. First, it will bring together information concerning the members of the different specialized fields: numbers, growth trends, occupational characteristics, and personal characteristics. The second general topic is the potential supply. It has been widely known that the United States is not coming anywhere close to making full use of its intellectual potential. On that point, therefore, there is nothing startlingly new that the Commission can say. Its report, however, will present more definitive and recent data than have previously been available on the details of how many students of what kinds of ability progress to what levels of training, and what the current trends are in these regards. The third general topic is the difficult problem of demand. It is obviously impossible to state with assurance what the demand for a particular type of specialist will be at any given time in the future. The Commission's data, however, will provide useful guide lines for evaluating statements about demand and for appraising the possibility of meeting projected demands. The final section of the report will discuss the implications of the findings for educational and manpower policy planning purposes.

Publication of this report will complete the first phase of the Commission's work. Originally, that was all that was planned. But last winter the Conference Board approved the Commission's recommendation that it would be worthwhile to continue activities for an additional two years. The Rockefeller Foundation agreed and has granted funds which will enable the Commission to continue until the fall of 1954.

In the second two-year period, the Commission will continue some of the studies in which it is already engaged. In addition, it will work in two new areas. One is to study the occupational records of young people who have the intellectual ability normally required for advanced training but who do not obtain that training. Into what kind of jobs do these people go? How effectively is society using their abilities? How much of their talent is being wasted because of the lack of advanced training and

how much is being channeled into fields for which college is not a necessary preparation? These are some of the questions upon which the Commission hopes to get information in the next two years.

The other new area is that of personality differences among people in different fields of specialization. Substantial information has already been obtained on the academic records, socio-economic backgrounds, and aptitude test scores of people who graduate from college or who enter graduate work in each of the major fields. But there is much overlapping among the different fields. It seems reasonable to expect that there are significant differences in interests, attitudes, and personality factors which distinguish scientists from business executives, social scientists from humanists, or engineers from educators. This seems a reasonable hypothesis, but it is by no means certain that useful information can be secured on just how the specialized groups do differ from each other. Personality tests are far from satisfactorily reliable and valid. Personality differences may be very large within a field, for the types of work in many fields are quite diverse and may appeal to equally diverse types of people. The Commission is aware of these difficulties and is entering this field with full knowledge that the results may be disappointingly small. Nevertheless, the Commission has decided that personality features should be investigated in the hope that the resulting data will add significantly to our knowledge of

the characteristics of America's different groups of specialists.

One of the most satisfying aspects of the Commission's work has been the opportunity to bring some coordination into the various efforts to study the nation's manpower resources and requirements. Too much of the work has been partial and segmental: the military services are primarily interested in military manpower; engineers are interested in the supply of engineers; there are much more generous fellowship programs in some of the specialized areas than in others. While these efforts may be very good, they are still only partial. It remains true that the next generation of specialists of all kinds will come out of the present generation of students; policies intended for one group affect other groups as well; actions which affect the number of students enrolling in college influence the supply of people in all specialized areas. Consequently, more useful information on supply and demand is likely to be secured if the problems are approached as a totality instead of being studied in a segmental fashion. The Commission has been free from the narrowing influences of having to concentrate on any particular group, and as a result has been able to study all types of specialists. In that program, and working cooperatively with many other agencies interested in manpower problems, the Commission has helped to bring about a broader and more inclusive approach to the study of the nation's intellectual resources and requirements.

SCIENCE NEWS

ACADEMY-COUNCIL REPRESENTATIVE ON NATIONAL COMMISSION FOR UNESCO

Esmond R. Long, Director of the Henry Phipps Institute at Philadelphia, has been designated the representative of the National Academy of Sciences-National Research Council on the United States National Commission for UNESCO. His term commences immediately and ends at the close of the annual meeting of the National Commission in 1954. The National Acad-

emy of Sciences and the National Research Council were formerly given separate representation on the United States National Commission. Dr. Long, under whom this representation is combined, replaces Ross G. Harrison, representative of the National Academy of Sciences, and Detlev W. Bronk, representative of the National Research Council, whose terms on the United States National Commission expired in 1951.

FORD FOUNDATION AIDS FULBRIGHT PROGRAM

The Conference Board of Associated Research Councils recently announced that it had received a grant of \$90,000 from the Ford Foundation to provide maintenance grants for university professors from countries in the Near East and South Asia who qualify for travel awards under the Fulbright Act. It is expected that the grant will enable approximately thirty professors to come to the United States for research and study during the academic year 1952-53.

The Committee on International Exchange of Persons of the Conference Board is at present engaged in selecting recipients of the grants from candidates proposed by the Fulbright foundations or commissions in Burma, Egypt, Greece, India, Iran, Iraq, Pakistan, the Philippines, and Turkey. Selection is based on leadership qualities and on the importance of the candidate's proposed project to the economic and social welfare of his country and to the development of international understanding. Grantees recommended by the Committee on International Exchange of Persons will be proposed to the Board of Foreign Scholarships of the Department of State for Fulbright travel awards.

The fields represented by the twenty-four professors already selected by the Committee include medicine, highway engineering, physics, metallurgy, rural education, philosophy, literature, fine arts, library science, economics, psychology, statistics, political science and public administration, law, and veterinary medicine.

Although most of the funds have already been allocated, scholars in foreign countries wishing to know whether additional grants are available should communicate with the United States educational foundation or commission in their respective countries.

AGRICULTURAL RESEARCH INSTITUTE

Approximately one hundred scientists, representative of agricultural industries and research agencies, met on December 10, 1951 to discuss plans for setting up a more adequate mechanism for the collaboration of industrial, academic, and governmental scientists in promoting agricultural research

and practices which will lead to the best long-term utilization of the nation's agricultural resources.

As a result of these deliberations, the Agricultural Research Institute has been organized under the auspices of the National Academy of Sciences-National Research Council. The new Institute will function as a fiscal organization of industries having a stake in agriculture participating through their designated technical representatives. The Agricultural Board will act as a functional and deliberative body of scientists appointed by the National Research Council to survey independently the scientific potentials of agriculture. The Agricultural Research Institute will not control either the membership or the activities of the Agricultural Board but will encourage its activities and benefit from participation in its proceedings.

The Agricultural Board will be able to stimulate, guide, and integrate the various agricultural activities centered in the Division of Biology and Agriculture of the National Research Council and will have the following functions: 1) to mobilize the scientific talent of government, industry, and universities into committees competent to comprehend the broad problems of agriculture and the order of priority with which they should be attacked; 2) to collect facts and evaluate existing knowledge in relation to predictable results of present policies or practices in agriculture; 3) to survey objectively and correlate trends of present research to select neglected areas most likely to yield profitable long-term results; 4) to disseminate knowledge and expedite the transition of research discovery to applications in technological practice, governmental policies, or the socio-economic affairs of an evolving population.

The functions of the Agricultural Research Institute will be the following: 1) to provide funds for the effective functioning of the Agricultural Board; 2) to provide information, suggest pertinent problems, and keep the Agricultural Board alert to the multitude of forces that determine the course of development of agricultural industry; 3) to disseminate among members the judgments, resultant implications, and applications of the Board's activities.

ESTABLISHMENT OF OFFICE OF INTERNATIONAL RELATIONS

At its meeting on June 15, the Governing Board of the National Academy of Sciences-National Research Council approved the establishment of an Office of International Relations to perform the functions formerly assigned to the Division of International Relations. This change from division to office status was recommended by the Foreign Secretary of the Academy who, by virtue of his position, has directed the international relations program of the Academy-Council since the Division of International Relations was formed many years ago.

In recommending the establishment of the new Office, the Foreign Secretary, Roger Adams, pointed out that the name "division" was inappropriate because activities in the field of international relations were not limited to any one division or branch of science. Furthermore, the program in international relations was rapidly taking a more significant place in the affairs of the Academy-Council and therefore the organizational structure should be changed in order to facilitate efficient administration of the expanded program.

Under the new setup which went into effect July 1, the Foreign Secretary of the Academy became Chairman of the Policy Committee of the Office of International Relations. In this capacity, he is responsible for the formulation of policies to guide the Academy-Council program in international relations. Wallace W. Atwood, Jr., formerly Executive Secretary of the Division of International Relations, will serve as Director of the new Office.

COMMITTEE ON SCIENCE IN UNESCO

The Committee on Science in UNESCO of the Office of International Relations met June 23 and 24 under the chairmanship of Maurice B. Visscher of the University of Minnesota. The Committee acts as the advisory body on scientific matters to the Program Committee of the U. S. National Commission for UNESCO and as a point of contact between American scientists and UNESCO.

The following were some of the problems given consideration at the recent meeting: 1) the promotion of international cooperation in science through the activities of the international scientific unions and through special cooperative programs such as arid zone research, the International Computation Center, and technical assistance; 2) the encouragement of greater knowledge and understanding of science and its methods on the part of the peoples of all countries; 3) current attacks in the United States on UNESCO in particular and the United Nations system in general; 4) the impediments to United States participation in international scientific conferences resulting from restrictive Government legislation.

Members of the Committee are preparing statements on UNESCO activities in various fields of science and related subjects. These statements will be submitted to journals for publication in an effort to promote public interest in and support for UNESCO programs.

At the suggestion of the Policy Committee of the Office of International Relations, the Committee on Science in UNESCO has adopted a plan for rotation of its membership. Commencing July 1 of this year, new members will be appointed for three-year terms.

The membership of the Committee for 1952-53 is as follows: E. C. Stakman, University of Minnesota, *Chairman*; Bart J. Bok, Harvard University; Ralph Cleland, Indiana University; Ralph L. Goetzenberger, Minneapolis-Honeywell Regulator Co.; Paul M. Gross, Duke University; Esmond R. Long, Henry Phipps Institute; John S. Nicholas, Yale University; W. A. Noyes, Jr., University of Rochester; and Maurice B. Visscher, University of Minnesota.

The following persons, most of whom have served on the Committee since its formation in 1947, terminated their active membership on July 1 but will continue to serve as consultants to the Committee: Merle Tuve, Carnegie Institution of Washington; Roger Revelle, Scripps Institution of Oceanography; Raymund Zwemer, Library of Congress; Gene Weltfish, Columbia University; and Dael L. Wolfe, National Research Council.

COMMITTEE ON GEOGRAPHY

The Committee on Geography, Advisory to the Office of Naval Research, held its tenth meeting May 16 and 17 to evaluate research proposals submitted to the Office of Naval Research since the previous meeting of the Committee in February. Following the meeting, a revised circular giving particulars concerning opportunities offered through the Office of Naval Research for support of research projects in geography was issued and distributed to university departments and leading geographers throughout the country. Additional copies of the circular are available on request.

The Committee expects to hold its next meeting in October. In order to ensure consideration by the Committee, research proposals should reach the Geography Branch, Office of Naval Research, at least one month prior to the meeting.

SCIENTIFIC AND TECHNICAL JOURNALS IN LATIN AMERICA

The Committee on International Scientific Publication of the Office of International Relations has assembled a list of names and addresses of scientific and technical journals in Latin American countries. Copies of this list may be obtained at Committee headquarters, 28 Newbury Street, Boston 16, Mass.

NEW DIVISION CHAIRMEN

The following appointments have been announced by Detlev W. Bronk, President of the National Academy of Sciences: A. Adrian Albert, professor of mathematics at the University of Chicago, as Chairman of the Division of Mathematics of the National Research Council; and Willis A. Gibbons, Associate Director of Research, U. S. Rubber Company, and Executive Secretary of the Science Advisory Committee of the Office of Defense Mobilization, as Chairman of the Division of Engineering and Industrial Research.

Dr. Albert succeeds Marston Morse, who has served as Chairman of the Division of Mathematics since it was organized a year ago. Dr. Gibbons succeeds C. R. Soderberg, who has served as Chairman of the Division of Engineering and Industrial Research since 1948.

NEW PROJECTS IN ARCTIC RESEARCH

R. C. Wallace, Executive Director of the Arctic Institute of North America, has announced fourteen new projects in arctic research which have been approved as Institute activities for the year 1952. Awards supporting these projects have been made by the Institute, with the financial cooperation of the Office of Naval Research, to qualified specialists selected from applications submitted to the Institute.

The projects cover studies in anthropology, botany, geography, glaciology, entomology, and zoology and include the following: continuation of the anthropological investigations carried on in the Aleutian Islands under the direction of William S. Laughlin, University of Oregon; continuation of studies by Henry Paul Hensen, Oregon State College, of post-ice age forests as recorders of past climatic variations and forest migrations; studies by Marjorie C. Findlay on the adoption of sheep farming by Greenlandic seal hunters as related to changes in Greenlandic economy brought about by the increasing temperatures of northern Atlantic waters during the past thirty years; follow-up studies by Maynard M. Miller on the glaciological investigations carried on by the American Geographical Society on the Juneau Ice Field; and comparative studies of the physical condition, rate and mode of flowage, and origin of structures in the ice of a single relatively simple glacier by R. P. Sharp, California Institute of Technology.

APPOINTMENTS IN DIVISION OF GEOLOGY AND GEOGRAPHY

Ernst Cloos, Chairman of the Department of Geology, The Johns Hopkins University, and Richard J. Russell, Dean of the Graduate School, Louisiana State University, will continue as Chairman and Vice-Chairman of the Division, respectively, for the year 1952-53.

The following persons were appointed members of the Division for three-year terms: Joseph T. Singewald, Jr., The Johns Hopkins University; John T. Rouse, Magnolia Petroleum Corp.; Harry H. Hess, Princeton University; William C. Krumbein, Northwestern University; and James G. L. U. S. Geological Survey.

APPLICATIONS FOR GRANTS IN CANCER RESEARCH

The Committee on Growth of the National Research Council, acting for the American Cancer Society, is accepting applications for grants in support of cancer research. Applications for new grants received before October 1 will be considered during the winter, and grants recommended at that time will become effective July 1, 1953. Investigators now receiving support will be notified individually regarding application for renewal of these grants.

The Committee feels that a clear understanding of cancer must rest upon a deeper insight into the nature of the growth process, both normal and malignant. Therefore, the scope of the research program is very broad and includes, in addition to clinical investigations on cancer, fundamental studies in the fields of cellular physiology, morphogenesis, genetics, virology, biochemistry, metabolism, nutrition, cytochemistry, physics, radiobiology, chemotherapy, endocrinology, and environmental cancer.

During the past year the American Cancer Society, Inc., on recommendation of the Committee on Growth, has awarded approximately 250 grants totaling about \$1,700,000. A program of similar magnitude is contemplated for the coming year.

Application blanks and additional information may be obtained from the Executive Secretary, Committee on Growth, National Research Council, 2101 Constitution Avenue, Washington, D. C.

ATLAS OF TUMOR PATHOLOGY

The Subcommittee on Oncology of the Committee on Pathology of the Division of Medical Sciences is preparing an *Atlas of Tumor Pathology*. The *Atlas* project is sponsored by the American Cancer Society, the National Cancer Institute, the Armed Forces Institute of Pathology, the Veterans' Administration, the Jane Coffin Childs Memorial Fund for Medical Research, and the Anna Fuller Fund.

The *Atlas*, which groups tumors by regions, will consist of forty fascicles written by thirty-six authors. The tumors of each region are discussed by a pathologist with

particular interest in and experience with that region. Each fascicle is subjected to extensive review by selected critics and by the members of the Subcommittee on Oncology.

It is the Subcommittee's hope that the availability of a well illustrated atlas at low cost will enable pathologists throughout the country to make more uniform and accurate diagnoses of tumors. The seven fascicles thus far completed may be obtained from the American Registry of Pathology, Armed Forces Institute of Pathology, Washington.

SYMPOSIUM ON OCEANOGRAPHIC INSTRUMENTATION

A three-day Symposium on Oceanographic Instrumentation, sponsored by the Office of Naval Research, was held at Rancho Santa Fe, near La Jolla, Calif., June 21-23. Arrangements for the Symposium were made by R. C. Gibbs, Chairman of the Division of Physical Sciences of the National Research Council. Columbus O'D. Iselin, Woods Hole Oceanographic Institution, and John D. Isaacs, Scripps Institution of Oceanography, served as moderators. Proceedings of the Symposium will be published at an early date.

Subjects discussed at the Symposium included the philosophy of oceanographic instrumentation, current measurements, biological instruments, temperature measurements, geophysical measurements, sea-ice problems, underwater sound instrumentation, U. S. oceanographic vessels, wave measurements, chemical measurements, bottom sampling, and air-sea boundary processes.

SYMPOSIUM ON MICROSEISMS

The Division of Physical Sciences is arranging a Symposium on Microseisms to be held early in September under the sponsorship of the Office of Naval Research. Perry Byerly, Chairman of the Department of Geological Sciences at the University of California, will serve as moderator. Attendance will be by invitation and will be limited to those participating in the program. The proceedings of the meeting will be published.

COMMITTEE ON PLANT AND CROP ECOLOGY

The Subcommittee on Plant Crop Yields of the Committee on Plant and Crop Ecology met on June 20 under the chairmanship of Victor R. Boswell of the Department of Agriculture. A program to compile information on island vegetable production during World War II was approved. The program will involve a survey and evaluation of the many scattered technical reports from both hydroponic and soil gardening enterprises. A published summary of the findings will be made available to all agricultural agencies and territorial administrators, as well as to interested military groups.

The Subcommittee on Crop Geography and Vegetable Analysis has completed the first phase of its field study project on aerial photographic interpretation of cereal groups in the Midwest. Scientists from the National Bureau of Standards, the Production and Marketing Administration, the Bureau of Entomology and Plant Quarantine, the Bureau of Plant Industry, the Navy Photo-Interpretation Center, the Memphis Air Stations, and the Smithsonian Institution are cooperating in the undertaking. It is expected that, after an analysis of preliminary data, further research will continue, thus extending the Subcommittee's activities into the summer of 1953.

STAFF CHANGES IN DIVISION OF BIOLOGY AND AGRICULTURE

Samuel L. Meyer has been appointed Executive Director of the American Institute of Biological Sciences and will succeed Milton O. Lee as Executive Secretary of the Division of Biology and Agriculture of the National Research Council on September 1. Dr. Meyer received his M. S. degree from Vanderbilt University and his Ph.D. degree from the University of Virginia. He comes to his new post on a leave of absence from Florida State University, where he is professor and head of the Department of Botany.

Dr. Lee will devote full time to his duties as Secretary of the Federation of American Societies for Experimental Biology and Executive Secretary and Managing Editor of the American Physiological Society.

HIGHWAY SAFETY RESEARCH CORRELATION CONFERENCE

The first Highway Safety Research Correlation Conference was held in Washington June 5 and 6 under the auspices of the National Academy of Sciences-National Research Council Committee on Highway Safety Research. Approximately sixty-five scientists and engineers from all parts of the country and representing about fifteen specialized fields discussed research that had been carried out on human and physical factors in relation to traffic accidents. The discussions covered such topics as drugs, sleep, and fatigue; human engineering research; problems in the field of vision; the use of methods of operations-research and statistics; and problems of motivation and of attitudes of the driving public.

A report of the Conference is being drawn up, and the recommendations therein will be submitted to traffic and research people who could not attend.

COMMITTEE ON HIGHWAY SAFETY RESEARCH

The Chairman of the National Research Council appointed Harold V. Gaskill Chairman of the Committee on Highway Safety Research, effective July 1, to succeed E. R. Hilgard, Dean of Graduate Studies at Stanford University. Dr. Hilgard will continue as a member of the Committee.

Dr. Gaskill, Dean of the Division of Science and Director of the Industrial Sciences Research Institute at Iowa State College, is at present in Washington serving as Deputy Chief of Research and Development in the Office of Chief of Staff, U. S. Army. Dr. Gaskill, in his capacity as Dean at Iowa State College, has taken an active part in highway safety activities for many years and has been instrumental in backing research programs related to safety on the highways.

T. W. Forbes, Executive Secretary of the Committee on Highway Safety Research, has resigned his post of associate professor of psychology at the University of Hawaii in order to continue in his present capacity with the Committee and to accept the additional appointment as Technical Director.

INTERNATIONAL RELATIONS

SCIENTIFIC UNIONS

ICSU

The Sixth General Assembly of the International Council of Scientific Unions will be held in Amsterdam, October 1-3. The Royal Netherlands Academy of Sciences is in charge of local arrangements. The United States will be represented by an official delegation nominated by the National Academy of Sciences-National Research Council and appointed by the U. S. Department of State.

The following items, among others, will appear on the agenda of the forthcoming Assembly: 1) adherence of Israel, Thailand, Spain, and the German Federal Republic; 2) admission of new unions (Mathematics, Physiology, and possibly others); 3) adoption of new statutes; 4) plans for the International Geophysical Year, 1957-58; 5) proposal to conduct gravity observations in the Arabian Sea and Indian Ocean; 6) ICSU-UNESCO agreements; and 7) reports of the various constituent unions and joint commissions and of the International Abstracting Board.

Additional information on plans for the Sixth General Assembly will be published in the September-October issue of *NEWS REPORT*.

IGU

The Department of State has announced that the official United States delegation to the Eighth General Assembly of the International Geographical Union, which convenes in Washington, August 8-15, will be composed of the following persons: Wallace W. Atwood, Jr., National Academy of Sciences-National Research Council, *Chairman*; Samuel W. Boggs, Department of State; Edwin J. Foscue, Southern Methodist University; Robert M. Glendinning, University of California; Gilbert H. Grosvenor,

National Geographic Society; Otto E. Guthe, Department of State; Chauncy D. Harris, University of Chicago; Preston E. James, Syracuse University; Lester E. Klimm, University of Pennsylvania; Richard U. Light, American Geographical Society; Glenn T. Trewartha, University of Wisconsin; and John K. Wright, American Geographical Society.

Arrangements for the General Assembly and the Seventeenth International Geographical Congress, which will be held in conjunction with the Assembly, have been handled by the United States National Committee of the Union, a permanent committee of the National Academy of Sciences-National Research Council.

The following geographers have recently been designated to represent the National Research Council at the Congress: Burton W. Adkinson, Library of Congress; Meredith F. Burrill, Department of the Interior; Andrew H. Clark, University of Wisconsin; George B. Cressey, Syracuse University; Samuel N. Dicken, University of Oregon; Edward B. Espenshade, Jr., Northwestern University; Richard Hartshorne, University of Wisconsin; G. Donald Hudson, University of Washington; Clarence F. Jones, Northwestern University; George H. T. Kimble, American Geographical Society; Clyde F. Kohn, Northwestern University; Walter W. Ristow, Executive Secretary of the U. S. National Committee; Arthur H. Robinson, University of Wisconsin; Samuel Van Valkenburg, Clark University; and Guido G. Weigend, Rutgers University.

The program of the Congress will include section and commission meetings at which scientific papers will be presented, symposia on topics of world-wide interest, and excursions to various parts of the United States.

Delegates to the General Assembly and members of the Congress will be welcomed on August 8 by the Assistant Secretary of State, the Honorable John D. Hickerson.

That same evening they will be guests at a reception given by the Under Secretary of State, the Honorable David K. Bruce, and Mrs. Bruce. On August 9, the National Geographic Society will be host at an evening program in Constitution Hall and, on August 11, the National Academy of Sciences will receive the group at a lawn party on the Academy grounds. The Congress banquet will be held on August 13, and the final Assembly on August 15 will close the eight-day meeting.

URSI

The United States will be represented by an official delegation at the Tenth General Assembly of the International Scientific Radio Union, to be held at Sydney, Australia, August 11-21. The following scientists have been designated as members of the United States delegation: Charles R. Burrows, Cornell University, *Chairman*; Henry G. Booker, Cornell University; J. Howard Dellinger, Radio Corporation of America; Harold E. Dinger, Naval Research Laboratory; and Arthur H. Waynick, Pennsylvania State College. The alternate delegates are Francis J. Gaffney, Brooklyn Polytechnic Research and Development Co.; Jack A. Morton, Bell Telephone Laboratories; Alan H. Shapley, National Bureau of Standards; and Samuel Silver, University of California.

Through the coordinated efforts of the Department of State, the National Science Foundation, and the Office of Naval Research, all members of the above delegation will be able to attend the General Assembly. A majority will receive financial assistance from one or more of these Government agencies. Several scientists who are not members of the official delegation will receive similar aid, thus ensuring a strong United States representation at the Sydney meeting.

IAU

The following scientists have been designated official United States delegates to the Eighth General Assembly of the International Astronomical Union, to be held in Rome, September 4-13: Otto Struve, University of California, *Chairman*; Ira S. Bowen, Mount Wilson Observatory; Dirk Brouwer, Yale University Observatory;

Gerald M. Clemence, United States Naval Observatory; Jason J. Nassau, Case Institute of Technology; and Fred L. Whipple, Harvard University. The alternate delegates are Leo Goldberg, University of Michigan, and Gerard P. Kuiper, University of Chicago.

Arrangements for the forthcoming Assembly are being made by the Consiglio Nazionale delle Ricerche in Rome. In addition to symposia on stellar evolution, astronomical instrumentation, and the astrometry of faint stars which have been scheduled during the period of the General Assembly, there will be meetings of the Joint Commission on Solar and Terrestrial Relationships and of the Joint Commission on Spectroscopy.

The Consiglio Nazionale delle Ricerche has arranged for visits to various observatories in and around Rome and is organizing excursions to points of interest in other parts of Italy.

INTERNATIONAL GEOLOGICAL CONGRESS

The United States will be represented by an official delegation appointed by the Department of State at the Nineteenth International Geological Congress, which will be held in Algiers, September 8-15. Although official designation of the delegation must await more definite information on the availability of persons selected to serve as delegates, it is possible at this time to announce the probable membership.

Unless last-minute changes become necessary, the United States delegation will be as follows: William E. Wrather, Director, U. S. Geological Survey, *Chairman*; Finn E. Bronner, Department of Defense; Walter H. Bucher, Columbia University; A. F. Buddington, Princeton University; Edward B. Burwell, Jr., Department of Defense; Ernst Cloos, National Research Council; D. M. Davidson, E. J. Longyear Co.; Morgan Davis, Humble Oil and Refining Co.; Maurice Ewing, Columbia University; H. G. Ferguson, U. S. Geological Survey; W. D. Johnston, U. S. Geological Survey; A. I. Levorsen, Consulting Geologist; T. S. Lovering, U. S. Geological Survey; Raymond C. Moore, University of Kansas; Howel Williams, University of California; and W. P. Woodring, U. S. Geological Survey.

CONGRESS OF ANTHROPOLOGICAL AND ETHNOLOGICAL SCIENCES

The Chairman of the National Research Council has designated William N. Fenton, Executive Secretary of the Division of Anthropology and Psychology, the Council's representative at the Fourth International Congress of Anthropological and Ethnological Sciences, to be held in Vienna, Austria, September 1-8. Dr. Fenton has also been designated official United States delegate to the Congress by the Department of State.

The Congress will be devoted to the presentation and discussion of papers in the various branches of anthropological and ethnological sciences and to the ratification of plans for the formation of a new international union. Delegates to the Congress will be asked to vote on the adoption of the draft statutes which have been prepared for the proposed International Union of Anthropological and Ethnological Sciences and also to ratify the revised constitution of the Congress.

Plans have been made for a symposium on the primitive languages and cultures of the world now faced with extinction with a view to setting up an international program for acquiring adequate scientific records of these peoples and languages.

INTERNATIONAL UNION FOR THE PROTECTION OF NATURE

The Third General Assembly of the International Union for the Protection of Nature will be held in Caracas, Venezuela, September 3-9. The United States group in attendance will include observers from various Government agencies concerned with conservation and delegates from scientific institutions and societies which are members of the Union. The National Research Council will be represented by Harold J. Coolidge, a vice-president of the Union, and Ira Gabrielson, Chairman of the Union's Commission on Conservation Education. Mr. Coolidge and Dr. Gabrielson are both members of the National Research Council Committee on the Use and Care of Natural Resources. Alexander Wetmore, Home Secretary of the National Academy of Sciences and Secretary of the Smithsonian Institution, will represent the Smithsonian Institution at the General Assembly.

INTERNATIONAL CONGRESS OF BIOCHEMISTRY

The following scientists represented the National Research Council at the Second International Congress of Biochemistry, which was held in Paris, July 21-27: J. Murray Luck, Stanford University, *Chairman*; John T. Edsall, Harvard University; Joseph S. Fruton, Yale University School of Medicine; Glenn Greathouse, National Research Council; Severo Ochoa, New York University Medical College; J. L. Oncley, Harvard Medical School; and Warren Sperry, State Psychiatric Institute of New York.

The Division of Chemistry and Chemical Technology of the National Research Council awarded five travel grants to the following young biochemists to enable them to attend the Congress: Thomas D. Fontaine, Agricultural Research Center; George Kalnitsky, State University of Iowa; J. Oliver Lampen, Western Reserve University; Arthur B. Pardee, University of California; and Sidney Udenfriend, National Heart Institute.

Nineteen other American biochemists received travel grants from the National Science Foundation.

INTERNATIONAL UNION AGAINST CANCER

The United States National Committee of the International Union against Cancer, established this year by the National Research Council, selected six delegates to represent the United States at a symposium on lung cancer in Louvain, July 21-24.

The symposium was organized by the Committee on Geographic Pathology of the International Cancer Research Commission in order to coordinate research on the etiology of lung cancer at the international level. Papers presented at the symposium reported on studies of the relation of heavy smoking to lung cancer, surveys of possible industrial hazards and the value of mass radiological chest x-rays.

United States participation in the symposium was made possible through grants from the American Cancer Society, the Council for International Organization of Medical Sciences, and the National Cancer Institute.

INTERNATIONAL CONGRESS ON ANALYTICAL CHEMISTRY

The following scientists will represent the National Research Council at the International Congress on Analytical Chemistry and the Conference of the Analytical Section of the International Union of Pure and Applied Chemistry, to be held at Oxford, England, September 3-10: I. M. Kolthoff, University of Minnesota, *Chairman of the delegation*; S. E. Q. Ashley, General Electric Company; Roger G. Bates, National Bureau of Standards; M. G. Mellon, Purdue University; and John H. Yoe, University of Virginia.

INTERNATIONAL CONGRESS OF MATHEMATICIANS

Marston Morse, professor of mathematics at the Institute for Advanced Study, Princeton, and Chairman of the Division of Mathematics of the National Research Council, and John R. Kline, Chairman of the Department of Mathematics at the University of Pennsylvania, have been designated representatives of the National Academy of Sciences and National Research Council to the International Congress of Mathematicians to be held in Salzburg, Austria, September 9-14.

RECORD OF MEETINGS

May

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|-------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Annual Meeting, American Institute of Biological Sciences
Policy Committee, Medical Sciences Information Exchange | 14 | American Institute of Biological Sciences
Advisory Committee on Hydrobiology
Committee on Blood and Related Problems
Committee on Clothing, <i>New York City</i>
Subcommittee on Duck, <i>New York City</i> |
| 1-2 | Advisory Committee on Road Test One-MD | 15 | Committee on Plant and Crop Ecology
Subcommittee on Cardiovascular Diseases |
| 2 | Ad hoc Committee on Disaster Studies, <i>New York City</i>
Annual Meeting, Division of Biology and Agriculture
Committee on Plastics and Elastomers | 16 | Fellowship Policy Meeting |
| 2-3 | Annual Meeting, Division of Geology and Geography | 16-17 | Committee on Geography, Advisory to Office of Naval Research, <i>Gatlinburg, Tenn.</i> |
| 3 | U. S. National Committee, International Union of Pure and Applied Physics | 17 | Ad hoc Conference on Venereal Disease
Prophylaxis
Cobalt Supplies Panel, <i>New York City</i>
Committee on Dentistry
Subcommittee on Biochemistry
Subcommittee on Biology
Subcommittee on Clinical Investigation
Subcommittee on Etiology and Pathology |
| 4 | Review Committee, Section II, Nuclear Science Glossary
Committee on Geophysics, Advisory to Office of Naval Research
Subcommittee on Neutron Measurements and Standards
Subcommittee on Radiochemistry | 19 | Committee on Growth, <i>Boston, Mass.</i>
Conference on the Cytochemistry of the Nervous System
Subcommittee on Nervous System |
| 5 | Commission on Human Resources and Advanced Training | 21 | Committee on Chemicals
Conservation Committee
Subcommittee on Blood Coagulation |
| 8 | Committee on Cancer Diagnosis and Therapy
Subcommittee on Shock
Permanent Magnets Materials Sub-Group, <i>Chicago, Ill.</i> | 22 | Annual Meeting, Division of Engineering and Industrial Research
Conference on Amoebic and Bacillary Enteritis |
| 9-10 | Annual Meeting, Division of Anthropology and Psychology | 23 | Committee on Medicine |
| 10 | Executive Committee, Division of Medical Sciences | 24 | Conference Board of Associated Research Councils, Committee on International Exchange of Persons
Annual Meeting, Division of Medical Sciences |
| 12 | Advisory Committee on Intergovernmental Relationships in Highway Affairs | 26 | Joint Meeting of the Committee on Surgery and the Subcommittee on Burns
Mica Panel, <i>New York City</i> |
| 12-13 | American Institute of Biological Sciences
Advisory Committee on Biology | | |
| 13 | Subcommittee on Orthopedic Surgery | | |

- May
26-27 Committee on Hearing, *New London, Conn.*
27 Committee on Surgery
28 Beryllium Panel
Committee on Naval Guns
Conference on Tissue Culture Bibliography
Nickel Conservation Panel
29 Committee on Naval Medical Research
- June
2 Committee on Sanitary Engineering and Environment
Highway Research Board, Executive Committee
Subcommittee on Animal Reservoirs and Vectors of Disease
Subcommittee on Atmospheric and Industrial Hygiene
Subcommittee on Food Supply
Subcommittee on Waste Disposal
3 Scientific Advisory Committee, Prevention of Deterioration Center
4 Annual Meeting, Division of Mathematics
Annual Meeting, Division of Physical Sciences
Permanent Magnets Materials Sub-Group, *New York City*
Subcommittee on Sterilization of Blood and Plasma
5 Committee on Scientific Conferences
Committee on Veterans Medical Problems
5-6 Highway Safety Research Correlation Conference
6 Committee on Naval Armor
6-7 Committee on Drug Addiction and Narcotics, *Ann Arbor, Mich.*
9 Executive Committee, Division of Chemistry and Chemical Technology
9-10 Advisory Committee for WASHO Road Test, *Ogden, Utah*
- 10 American Geological Institute Committee on Personnel and Organization
Building Research Advisory Board
Committee on Materials for Use at Elevated Temperatures
Food Technology Subcommittee, *Grand Rapids, Mich.*
12 Committee on Foods, *Grand Rapids, Mich.*
15 Governing Board, National Academy of Sciences-National Research Council
16 Advisory Committee on Fellowship Selection Techniques, *Chicago, Ill.*
U. S. National Committee, International Union against Cancer
17 Non-magnetic Steels Panel
Permanent Magnets Materials Sub-Group, *Murray Hill, N. J.*
18 Committee on Atomic Casualties
Titanium Panel, *Cleveland, Ohio*
18-19 Titanium Symposium, *Cleveland, Ohio*
19 Pesticide Subcommittee
Toxicology Subcommittee
20 Committee on Plant and Crop Ecology
Food Protection Committee
20-22 Conference on Population Problems, *Williamsburg, Va.*
21 Subcommittee on Malaria
21-23 Symposium on Oceanographic Instrumentation, *Rancho Santa Fe, Calif.*
23 Committee on Definitions and Standards of Identity of Foods, *New York City*
23-24 Committee on Science in UNESCO, *Bethesda, Md.*
24 Ad hoc Committee on Stress
Advisory Board on Quartermaster Research and Development
Committee on Globes
Permanent Magnets Materials Sub-Group, *New York City*
27 Committee on Manpower, Advisory to Office of Scientific Personnel
28 Executive Committee, Chemical-Biological Coordination Center

NEW PUBLICATIONS

Analysis of Landslides. Highway Research Board Bulletin No. 49. Academy-Council Publication No. 220. 1952. 39 p. \$0.60.
Annual Report, 1951, Conference on Electrical Insulation. National Research Council. 1952. 56 p. \$3.00.
Calcium Chloride in Concrete. Highway Research Board Bibliography No. 13. Academy-Council Publication No. 217. 64 p. \$0.60.
Conference on Insecticide Resistance and Insect Physiology. Academy-Council Publication No. 219. 1952. 99 p. \$1.50.
Emergency Treatment in Major Disasters. Washington, Federal Civil Defense Administration, 1952. 57 p.

Imperfections in Nearly Perfect Crystals. New York, John Wiley & Sons, 1952. 490 p. \$7.50.
Off-Street Parking: Legislative Trends. Administrative Agencies. Highway Research Board Bulletin No. 48. Academy-Council Publication No. 218. 1952. 42 p. \$0.60.
Symposium on Radiobiology. The Basic Aspects of Radiation Effects on Living Systems. New York, John Wiley & Sons, 1952. 465 p. \$7.50.
Traffic Research Problem Statements. Highway Research Board Special Report No. 3. National Research Council. 1952. 33 p. \$0.45.
Weighing Vehicles in Motion. Highway Research Board Bulletin No. 50. Academy-Council Publication No. 221. 32 p. \$0.45.

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